Small Business Innovation Research/Small Business Tech Transfer

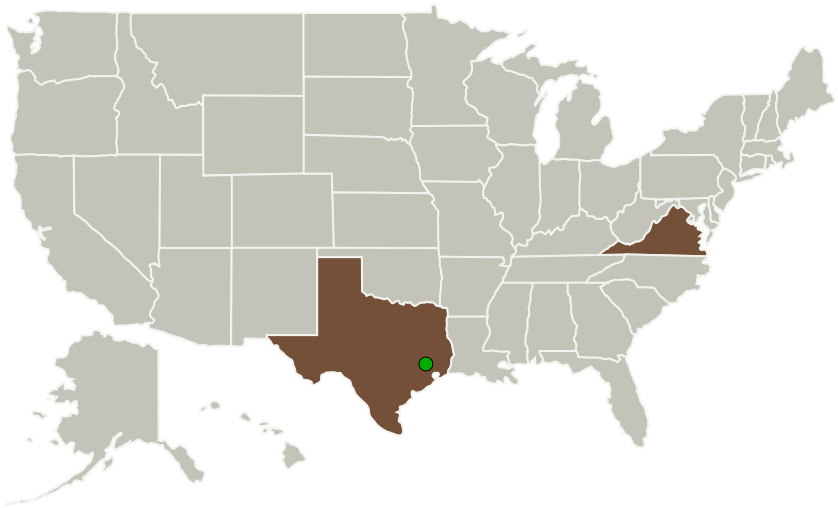
Rapid Activation of Biological Wastewater Treatment Systems, Phase II

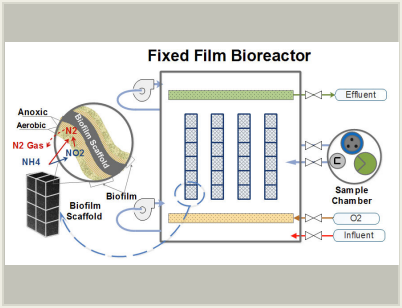
Completed Technology Project (2016 - 2019)

Project Introduction

Pancopia proposes development of a system with the capability to remove high levels of organic carbon and nitrogen from wastewater, capable of preservation for a year, and which can be used to reliably start up a biological wastewater system in 15 days. Phase 2 target criteria are 1) development of an inoculum capable of removing 95% of organic carbon, and 95% conversion of ammonium (75% removed as nitrogen gas and remaining 25% converted to nitrite/nitrate) when treating ersatz EPB wastewater with a startup time of less than 15 days; 2) development of a reactor that can effectively treat EPB wastewater; and 3) development of an operations manual providing process guidelines. PROBLEM/OPPORTUNITY: Properly configured biological wastewater systems can treat wastewater containing high organic carbon and nitrogen and produce a high quality effluent using minimal consumables. However, such systems can be difficult to startup rapidly and reliably. Developing a reliable inoculum to permit rapid startup of biological wastewater systems that treat high levels of organics and nitrogen would make such treatment viable. PLAN/PROCESS OUTLINE: Pancopia proposes to 1) To optimize lyophilization and reactivation of the inoculum developed in Phase I; 2) to develop a reactor system that permits accelerated startup; and 3) to operate the wastewater system for an extended period of time and develop an operations manual. BENEFITS: 1) Significant improvements in startup time and reliability for a system that can treat wastewater high in nitrogen, and 2) reduced costs due to optimization of bioreactor design and treatment optimization.

Primary U.S. Work Locations and Key Partners





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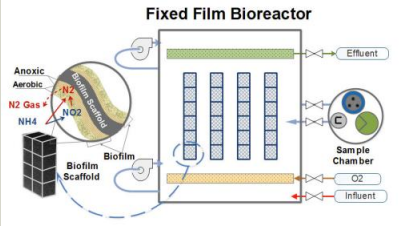
Completed Technology Project (2016 - 2019)

Organizations Performing Work	Role	Type	Location
Pancopia, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Hampton, Virginia
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Texas	Virginia

Images



Briefing Chart Image
Rapid Activation of Biological Wastewater Treatment Systems, Phase II
(https://techport.nasa.gov/image/125996)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Pancopia, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
William Cumbie

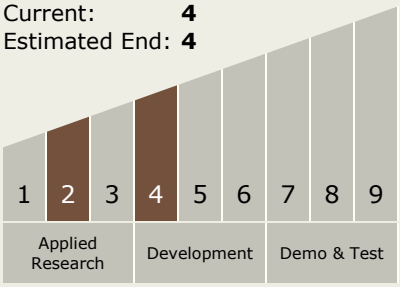
Co-Investigator:
William R Cumbie

Rapid Activation of Biological Wastewater Treatment Systems, Phase II

Completed Technology Project (2016 - 2019)

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.2 Water Recovery and Management

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System